internal report **379**

Topcon GTS 229 Survey Manual

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supervising scientist

Topcon GTS 229 Survey Manual

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1 Introduction

In June 2001 the Hydrological and Ecological Processes (HEP) group updated the Topcon GTS-3 theodolite and FC-5 data collector that has been in operation for approximately 10 years. This equipment has been used for accurate topographic surveying of erosion plot studies at Swift Creek (Ngarradj) and its tributaries, Ranger Mine waste rock dump, Tin Camp Creek, Nabarlek and Scinto 6.

The new total station is a Topcon GTS-229 which operates in a similar way to the GTS-3 but some of the methods and commands are different.

This report is principally designed to be a user friendly instruction manual for the use of the new total station, providing a description of the commands required to conduct a survey in the field using the new equipment. It is assumed that the user has a basic knowledge of surveying, including the initial set-up of the theodolite. This manual also covers the downloading of the survey pickups to the PC via Civilcad software and then to Excel spreadsheet format.

Should problems occur with the collection of survey data a more detailed manual for the GTS-229 is available in the HEP office. For any problems with the downloading of survey data Civilcad manuals are also available in the HEP department. There is a Civilcad toll free support hotlinen (ph 1800 068007). A support identification number will need to be quoted when using this service (05288-02267).

The supplier of this equipment (GTS-229 and Civilcad) is also a valuable source of information and is extremely helpful and co-operative in this regard.

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ABC Lasers
(07) 37172111

2 Set-up and collection of survey data

Ensure the instrument is set-up level and directly over the centre of a set-up point and turn the instrument on. For any general surveying using the new total station there are four consecutive steps that must be followed:

(1) **Enter job name**

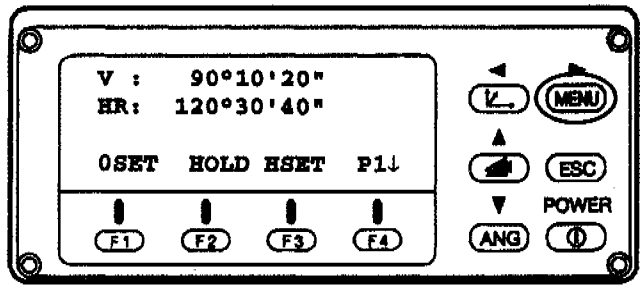
(2) **Enter occupied station details** – is the location of the instrument in terms of x, y, z coordinates.

(3) **Enter backsight details** – is the location of a known point near the instrument in terms of either x, y, z coordinates or an angle bearing.

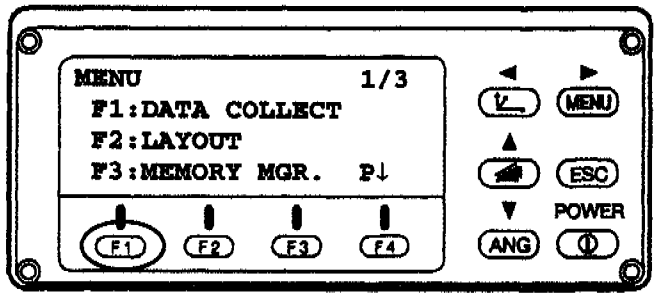
(4) **Collecting survey data**

2.1 Enter job name

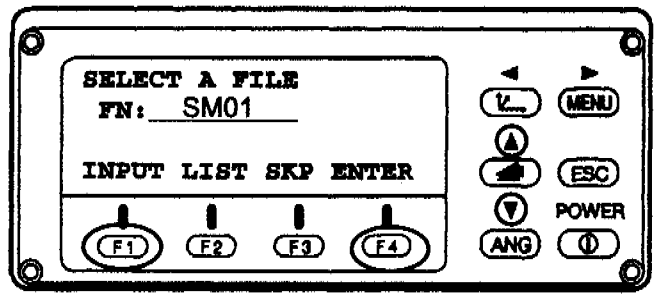
(a) MENU



(b) F1 DATA COLLECT

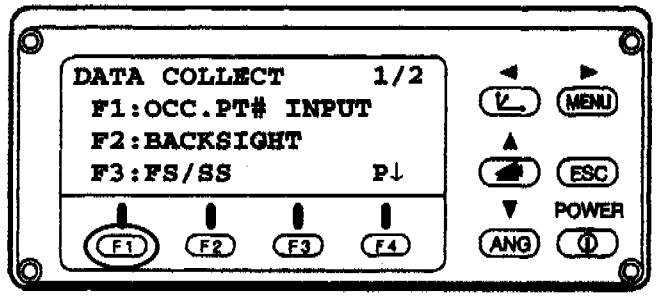


(c) Select a file F1 INPUT
Use up and down scroll arrows (as shown below) and function keys to scroll through numbers and letters to input a job name (FN).
When finished F4 ENTER

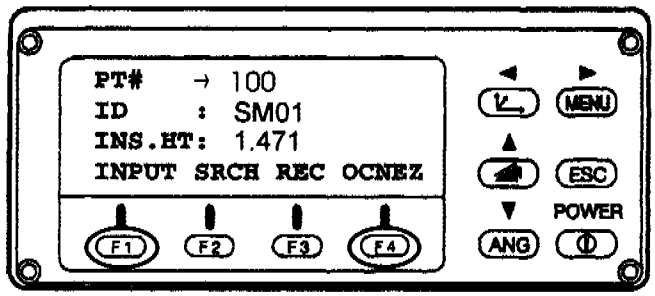


2.2 Enter occupied station details

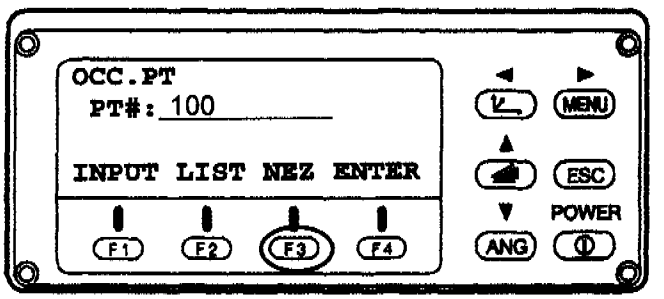
(a) Data collect.
F1: OCC.PT# INPUT



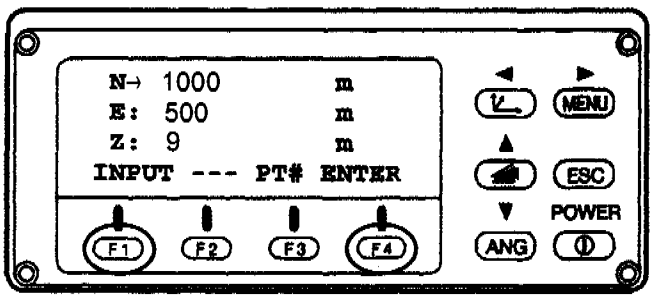
(b) F1 Input point number for occupied point.(set up point)
Use 100 for all occupied point numbers.
Then F4 ENTER when done.
Do same for "ID" and "INS.HT"
Then F4 OCNEZ



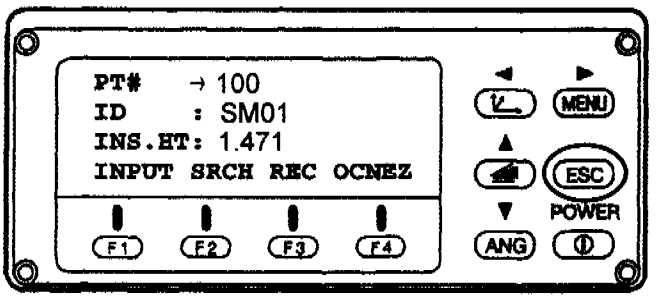
(c) F3 NEZ
No further input is required from this screen.



(d) F1 INPUT Input N (northing), E (easting) and Z (elevation) values for the set up point and press F4 ENTER after each entry.



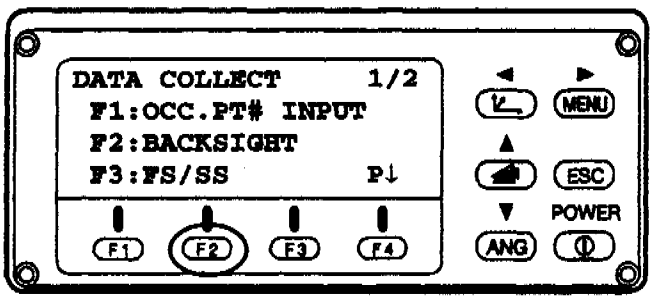
(e) After inputting the z value and hitting the enter key the screen will revert back to previous screen shown below. Occupied station details have now been completed.
Hit ESC to get to the next screen.



(f) You have now completed inputting the occupied point set up details.

2.3 Enter Backsight Details

(a) F2 BACKSIGHT



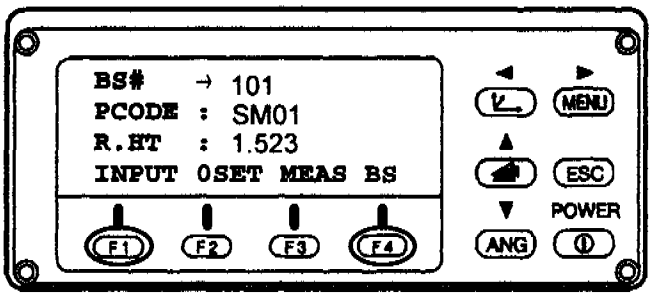
(b) F1 INPUT

BS# Use the number 101 for all backsight points F4 ENTER

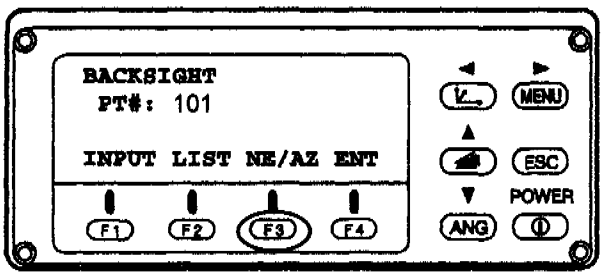
PCODE is the section name (ie SM01) F4 ENTER

R.HT is the prism height. (Note that the prism height does not need to be the same as total station height).

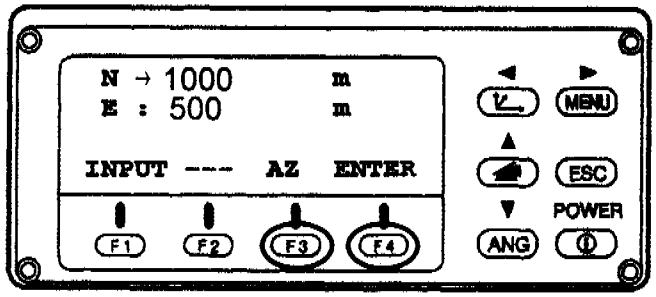
Once the R.HT has been entered F4 BS



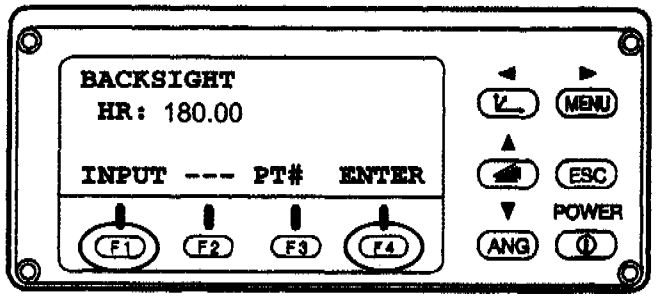
(c) F3 NE/AZ



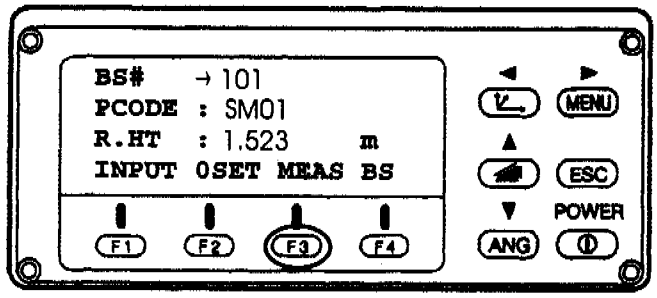
(d) For surveying cross-sections a backsight bearing is generally used. Press F3 AZ and go to step (e).
However, if known, the northing and easting co-ordinates can be entered. STOP now and position prism on backsight plinth. Carefully aim instrument at centre of prism before pressing F4 ENTER
The backsight details have now been set. Go to step (f).



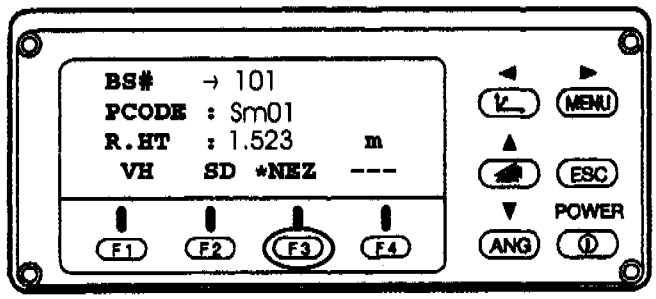
(e) F1 INPUT Input the backsight bearing for the section.
STOP now and position prism on backsight plinth. Carefully aim instrument at centre of prism before pressing F4 ENTER
The backsight bearing has now been set.



(f) To measure co-ordinates of backsight.
F3 MEAS

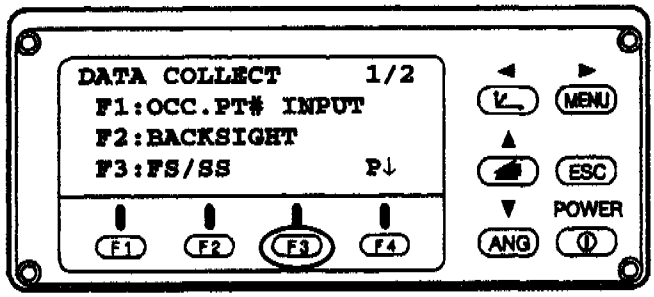


(g) F3 *NEZ Once this operation is completed the backsight is now set and measured.

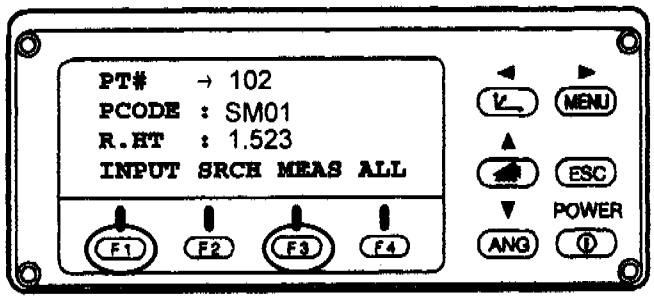


2.4 Collecting survey data

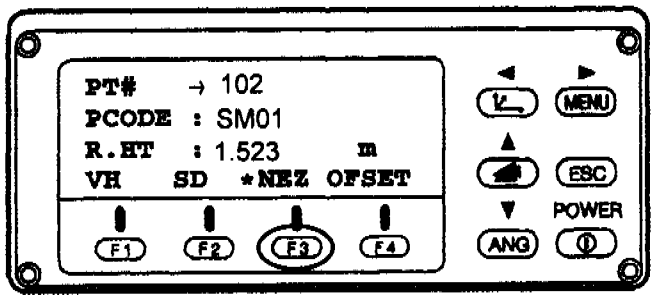
(a) F3 FS/SS



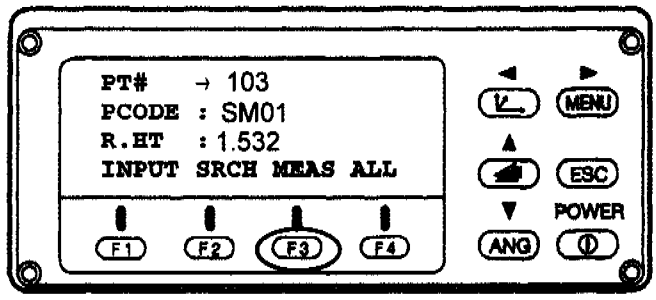
(b) F1 INPUT
PT# Use the number 102 for first survey point F4 ENTER
PCODE is the section name (ie SM01) F4 ENTER
R.HT is the prism height. (Note that the prism height does not need to be the same as total station height).
Once the R.HT has been entered sight total station at prism then F3 MEAS



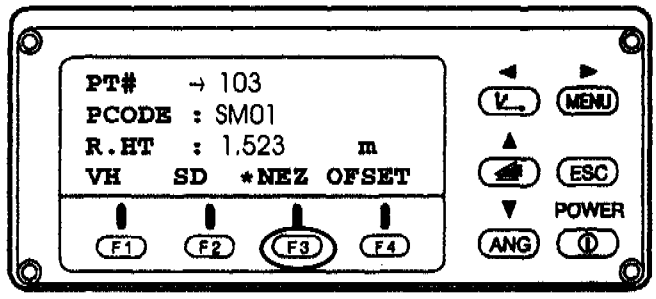
(c) F3 *NEZ



(d) A series of beeps means the point has been taken. The staff can now be moved to the next point. The screen will be the same as below. Note that the point number has increased by one - the total station will do this automatically for each survey point until the pickup has been completed. To continue the survey F3 MEAS If you need to change the point code or prism height for a particular survey point this can be done by using the F1 INPUT key and F4 ENTER keys. Then F3 MEAS



(e) F3 *NEZ



(f) Repeat steps (d) and (e) until survey has been completed then ESC This will signal to the machine that the survey of the job has been completed. The machine can now be turned off or a new job can be entered.

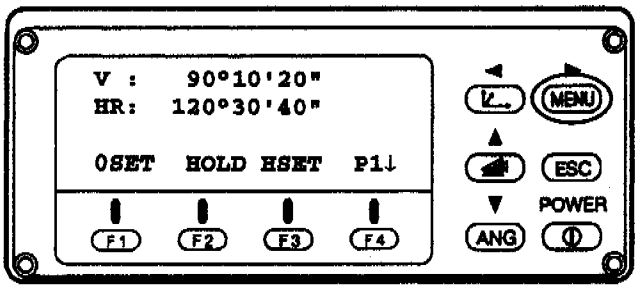
3 Downloading the survey data

Each day the survey data should be downloaded from the total station and stored in an appropriate format on the ***eriss*** network for further analysis. There are three steps in the download process which must be followed.

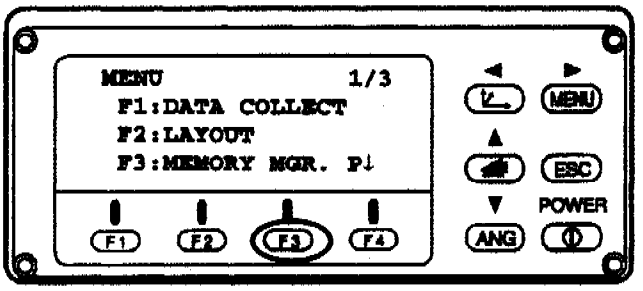
3.1 On Total station

(a) Connect total station to computer via Rs232 cable and turn power on.
Instrument does not need to be levelled.

(b) MENU



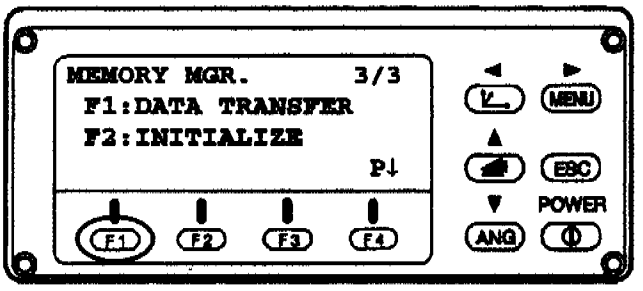
(c) F3 MEMORY MANAGER



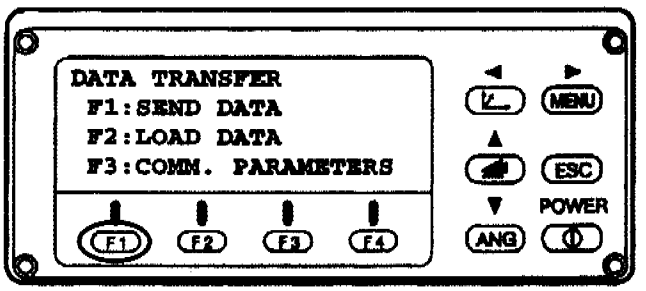
(d) F4 page down.

(e) F4 page down.

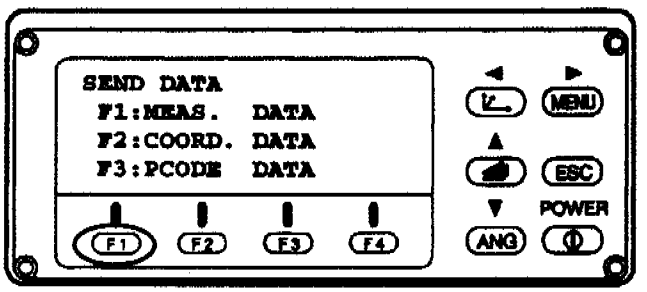
(f) F1 DATA TRANSFER



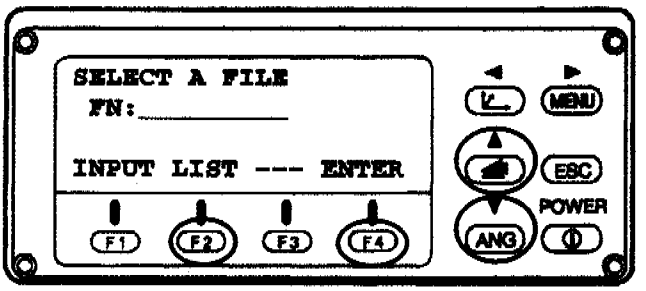
(g) F1 SEND DATA



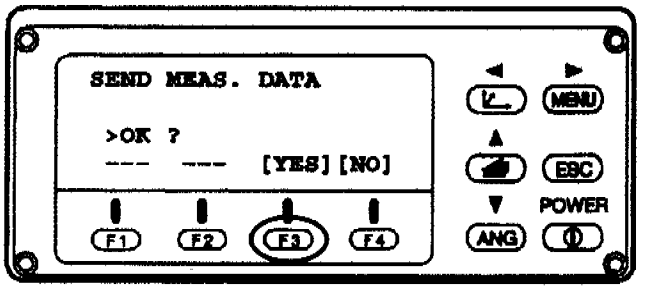
(h) F1 MEAS DATA



(i) Select a file. F2 LIST Use up and down scroll keys to select job for download. Then F4 ENTER



(j) Send measured data F3 [YES] **Do not hit F3 button until steps (a) to (k) in section 3.2 on the PC have been completed.**



(k) When download is complete turn total station off and disconnect.

3.2 On PC

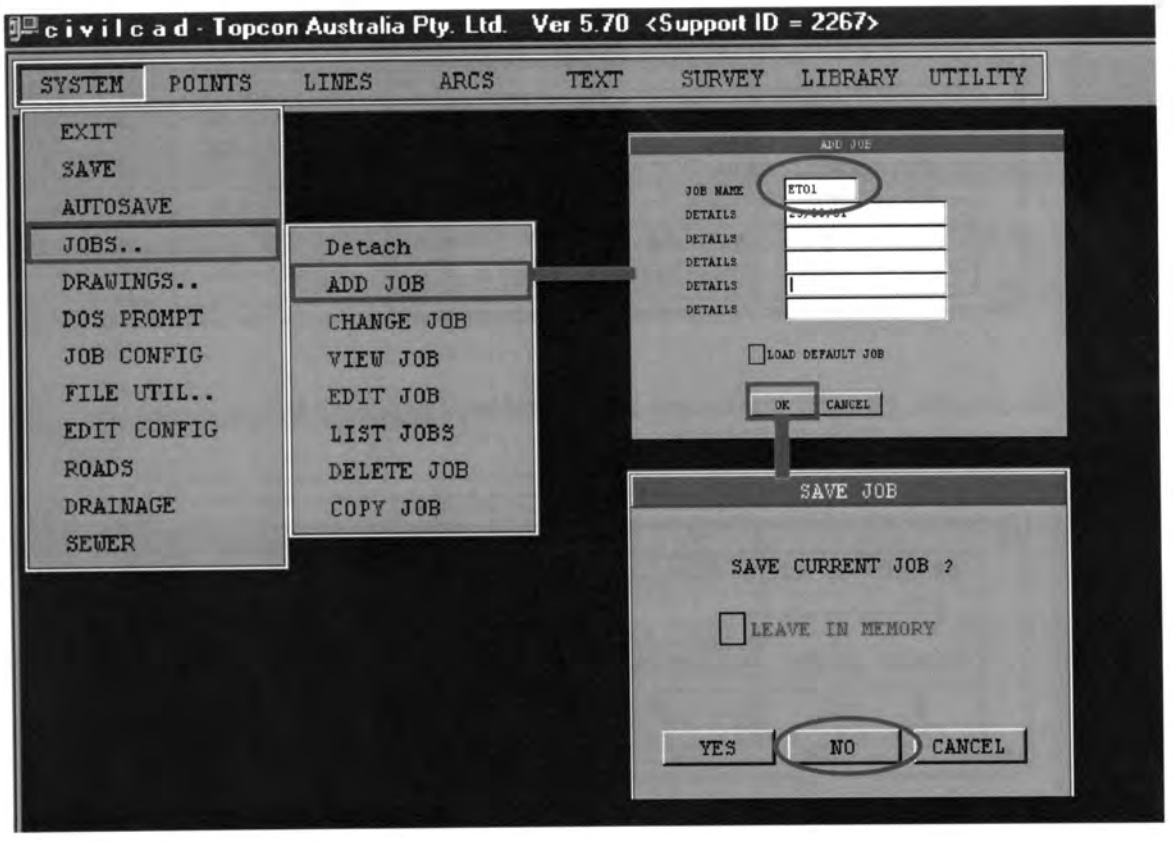
(a) Open civilcad 5.7 (icon).

(b) SYSTEM

(c) JOBS

(d) ADD JOB Type in job name. For consistency ensure the job name is the same as that for the file being downloaded from the total station.
OK

(e) SAVE CURRENT JOB No



(f) Check top right of screen that current file name is correct.

(g) SURVEY

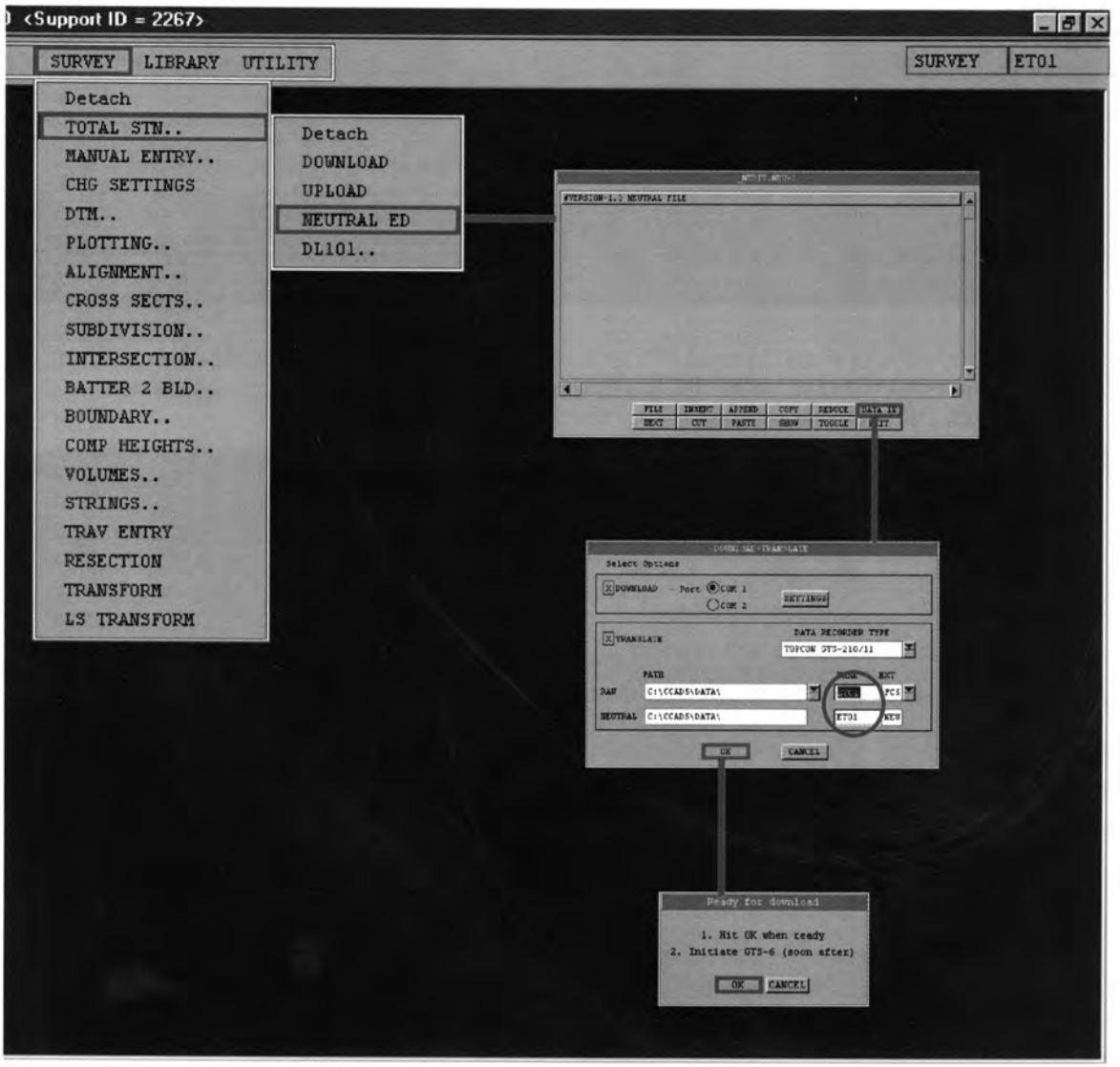
(h) TOTAL STATION

(i) NEUTRAL EDITOR

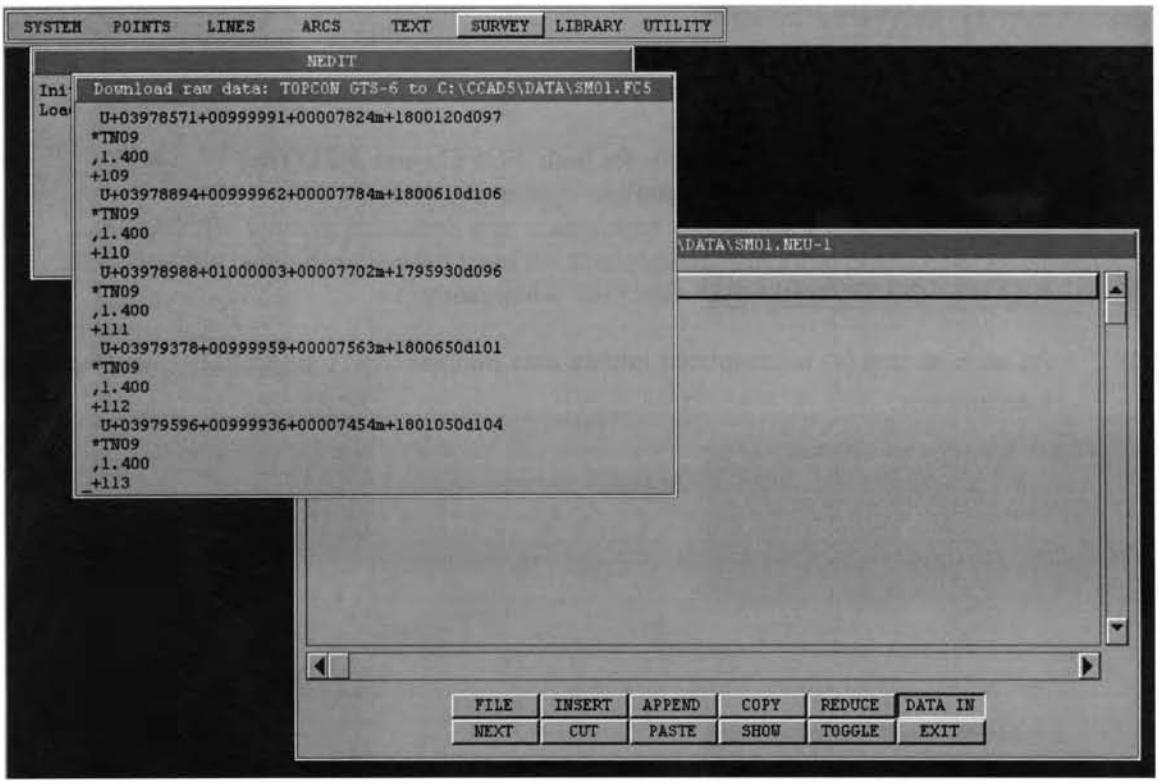
(j) DATA IN Type in name for jobs for both .FC5 file and .NEU file.
Keep name same as in total station
OK

(k) READY FOR DOWNLOAD Hit "OK" when ready

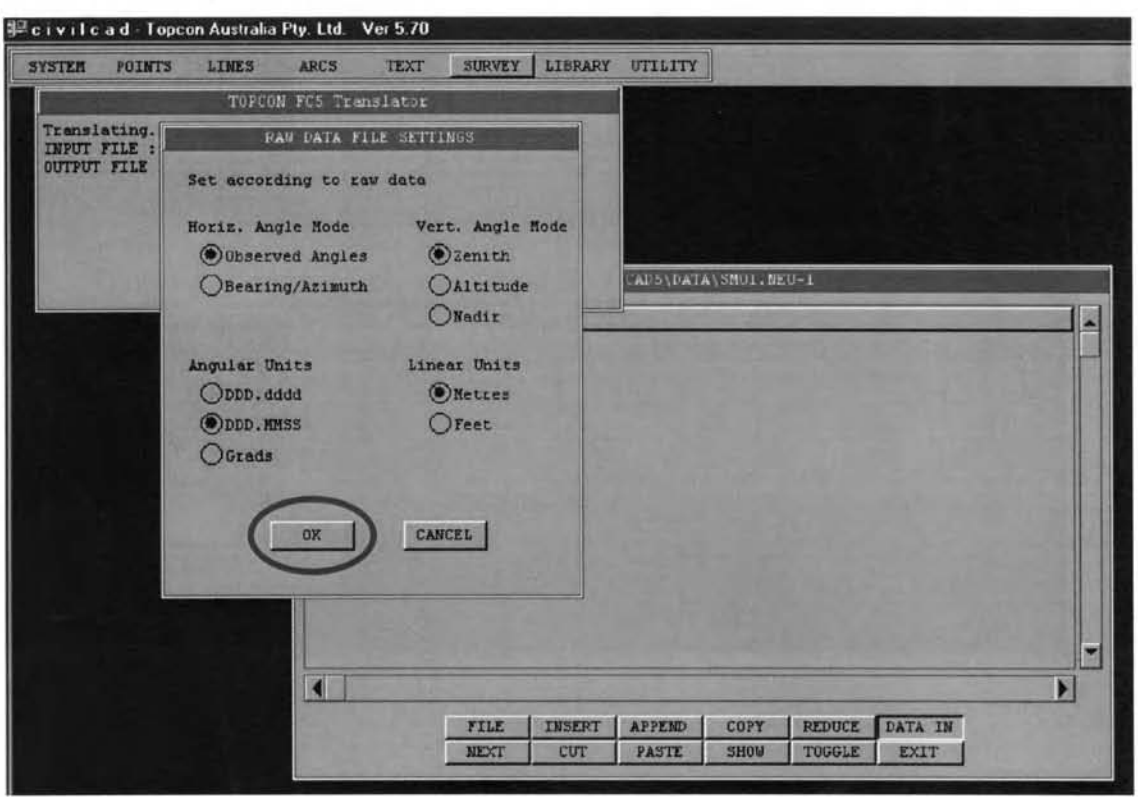
(l) As soon as step (e) is completed initiate data transfer from total station. (See step (j) on total station).



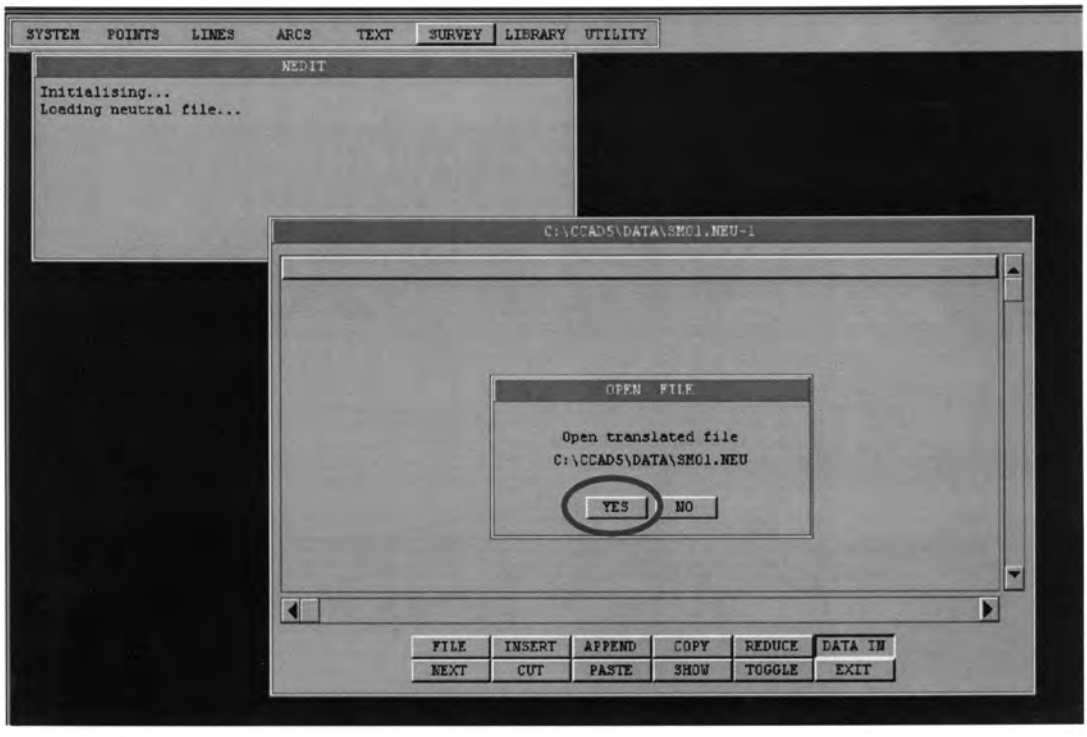
(m) Data can be seen on screen downloading.



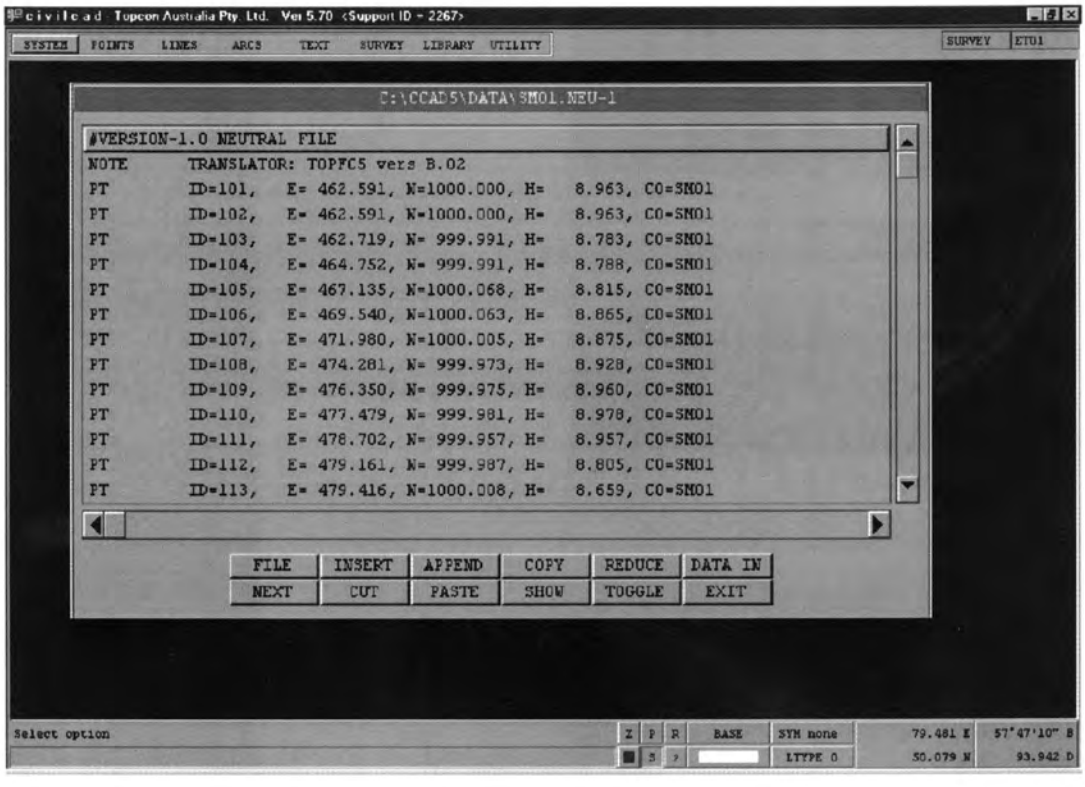
(n) When download is complete RAW DATA FILE SETTINGS
Click OK on these settings.



(o) OPEN FILE
YES



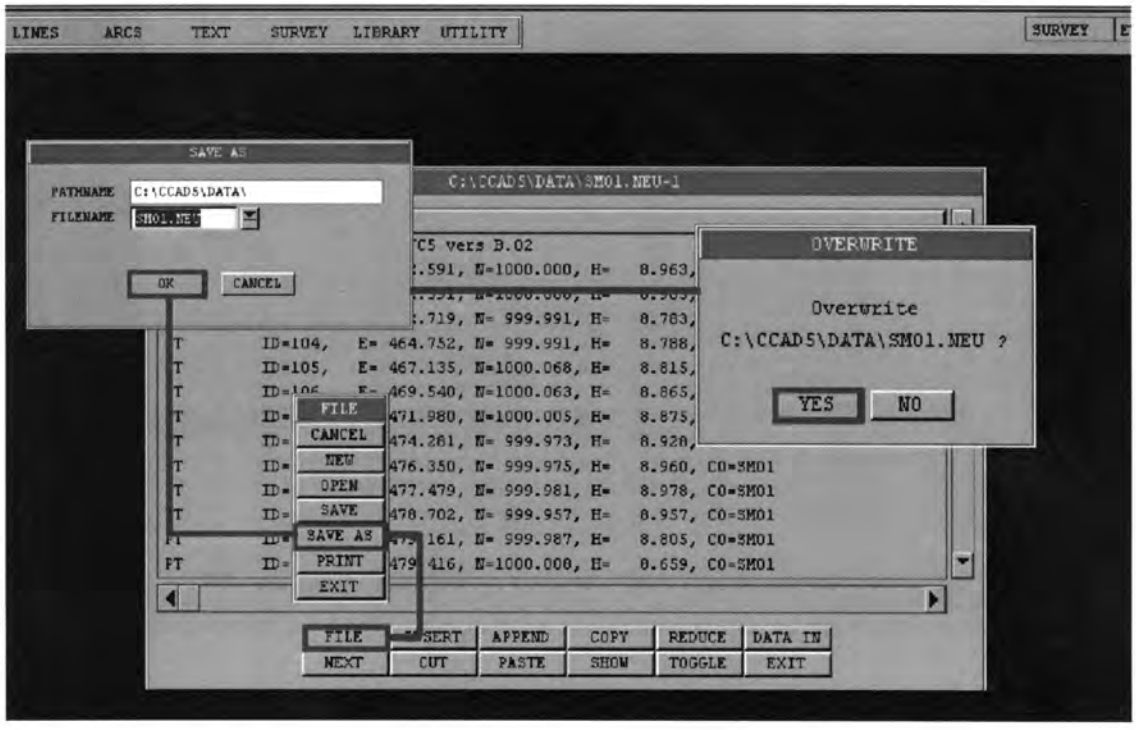
(p) Data will now be loaded into the neutral editor. To ensure data is in correct format to import into Excel it must be saved again and the .neu file is overwritten.



(q) FILE

(r) SAVE AS. Make sure file name is correct. OK

(s) OVERWRITE YES



(t) EXIT Shut down civilcad.
The .neu file is now in a format that can be read straight into Microsoft Excel.

4 References

Topcon. Instruction manual. Electronic Total Station. GTS-220 series. Topcon corporation Tokyo. Japan.

Civilcad. Civilcad 5.6 User manual. September 2000. Topcon Australia PTY LTD. NSW. Australia.